

Lat 40.73746 Lon -121.03856

Forest Health Protection

Pacific Southwest Region



Date: January 14, 2003
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To: District Ranger, Eagle Lake Ranger District, Lassen National Forest

Subject: Harvey Mountain GMA Administrative Study –
Monitoring the Effectiveness of Thinning Treatments
Progress Report (NE03-01)

Background

The objective of the Harvey Mountain GMA pre-commercial thinning project (implemented in 1999) was to reduce bark beetle activity by reducing stand density and increasing the health and vigor of residual pine trees. Increasing the longevity of the existing overstory of mature ponderosa (*Pinus ponderosa*) and Jeffrey pine (*Pinus jeffreyi*) was addressed by eliminating understory competition from white fir (*Abies concolor*). This project was also effective in reducing the risk of stand replacing wildfire due to the removal of ladder fuels. The resulting stand should be more resistant to bark beetle and wildfire-related tree mortality thus promoting the recruitment and retention of old-growth pine trees.

The objectives of the Harvey GMA Administrative Study (initiated in 2000) are to 1) document differences in tree mortality, tree vigor, and bark beetle activity between thinned and unthinned plots and 2) document long term changes in species composition, basal area, size class, and canopy closure in both thinned and unthinned plots. The

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monitoring plan (dated June 2001) included the establishment of permanent plots within the pre-commercially thinned area and an adjacent unthinned control area.

Results to date

Initial stand data indicate that the unthinned control plots had an average stand density (trees/acre) 7.0 times greater and an average basal area (sq.ft./acre) 2.0 times greater than the thinned plots (Tables 1, 2 and 5). The unthinned plots also averaged 36.5 times as many standing dead trees (< 12" dbh) as the thinned plots (Tables 1 and 2). Average canopy cover in the thinned plots was half that of the unthinned plots (unthinned 46%, thinned 23%) with the amount of canopy cover created by overstory pine equal among both treatments at 12 % (Tables 3 and 4). Mortality to date consists primarily of dead white fir in the unthinned control plots (Tables 6 and 7). Mortality of large overstory pine has yet to occur in either treatment. Observed insect activity includes bark, wood boring and twig beetles in pine and fir. Disease activity includes dwarf mistletoe and root disease infections (Table 8).

This administrative study will provide valuable information on the effectiveness of the pre-commercial thinning to achieve short and long term desired conditions for old growth pine stands in eastside forest types. In addition, it will evaluate the effectiveness of the thinning in preventing future bark beetle related mortality.

If you have any questions regarding this report and/or need additional information please contact me at 530-252-6431 or at dcluck@fs.fed.us.



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Initial Plot Data and Second Year Monitoring Results

Table 1. Initial average trees per acre in unthinned plots

	0-1"	1-6"	6-12"	12-18"	18-24"	24-30"	30-45"	Total
WF	82	634	122	10	0	0	0	848
PP/JP	0	106	10	6	12	2	10	146
Other	0	0	0	0	0	0	0	0
Total	82	740	132	16	12	2	10	994
Snags	18	258	16	0	0	0	0	292

Table 2. Initial average trees per acre in thinned plots

	0-1"	1-6"	6-12"	12-18"	18-24"	24-30"	30-45"	Total
WF	4	6	0	0	0	0	0	10
PP/JP	28	54	26	8	4	6	6	132
Other	0	0	0	0	0	0	0	0
Total	32	60	26	8	4	6	6	142
Snags	4	0	4	0	0	2	0	10

Table 3. Initial average canopy cover in thinned plots

Canopy Layer	Canopy Cover
Overstory	12%
Midstory	4%
Understory	8%
Total*	23%
Cover Species	
Ponderosa/Jeffrey pine	23%
White Fir	0%

*Total canopy cover considers overlap among the three canopy layers

Table 4. Initial average canopy cover in unthinned plots

Canopy Layer	Canopy Cover
Overstory	12%
Midstory	5%
Understory	36%
Total*	46%
Cover Species	
Ponderosa/Jeffrey pine	18%
White Fir	34%

*Total canopy cover considers overlap among the three canopy layers

Table 5. Average Basal Area

Treatment	Basal Area (sq.ft./acre)
Thinned	78.5
Unthinned	154.5

Table 6. Total mortality for all unthinned plots

Species	Initial Mortality		2001 Mortality		2002 Mortality	
	<6" dbh	>6" dbh	<6" dbh	>6" dbh	<6" dbh	>6" dbh
PP/JP	58	7	1	0	2	1
WF	955	63	34	10	48	25
Total	1013	70	35	10	50	26

Table 7. Total mortality for all thinned plots

Species	Initial Mortality		2001 Mortality		2002 Mortality	
	<6" dbh	>6" dbh	<6" dbh	>6" dbh	<6" dbh	>6" dbh
PP/JP	17	11	4	0	4	0
WF*	48	7	0	0	0	0
Total	65	18	4	0	4	0

*White fir was completely removed from thinned plots except for 5 trees under 6" dbh

Table 8. Summary of Insect and Disease Activity

Year	Treatment	Insect and Disease Activity
2000	Thinned	Light western dwarf mistletoe infections in pine
2000	Unthinned	Annosus root disease in white fir, light fir engraver beetle activity, heavy fir and moderate pine dwarf mistletoe infections, Jeffrey pine beetle hits on a couple of trees
2001	Thinned	Dwarf mistletoe same as 2000, Jeffrey pine beetle killed two small trees
2001	Unthinned	Most large pine suffered scattered branch dieback from twig beetles, Jeffrey pine beetle killed one tree, increased fir engraver related mortality
2002	Thinned	Woodboring beetles found in two small dead pines, scattered branch dieback on one large pine (twig beetles or root disease?), dwarf mistletoe same as 2001
2002	Unthinned	Mountain pine beetle and pine engraver beetle were found in two dead ponderosa pines, fir engraver beetle in conjunction with heavy dwarf mistletoe infections were responsible for extensive white fir mortality throughout all control plots